

Introduction

The purpose of our monitoring project is to determine if the native riparian bird populations at the Covered Bridge Park are declining when compared to the Zayante Trail.

Our investigative question is: are riparian bird populations declining at the Covered Bridge Park when compared to the Zayante Trail, and is this decline caused by increased urbanization at the Covered Bridge Park?

Our hypothesis that the native riparian bird populations at the Covered Bridge Park are declining when compared to the native riparian bird populations at the Zayante trail and that the decline is caused by increased human impacts from urbanization.

Sites

Covered Bridge Park Writeup

The Covered Bridge Park, located in Felton, California is a public park surrounded by residential and business areas. Adjacent to it is a shopping center and parking lot. The San Lorenzo River runs straight through the site.

Zayante Trail Writeup

The Zayante Trail, located in Felton, California is part of Henry Cowell State Park. This site is a good example of a pristine riparian habitat, lying on the banks of the San Lorenzo River.

Procedure

Materials:

Binoculars
Data Sheets
Clip board and writing utensil
reference guide
wind speed and temperature gage

Method:

Arrive at Covered Bridge Park and record the number of observers, temperature, wind speed and the time started. Walk predetermined route for 20 minutes, recording the birds observed by call or visual aided by the use of binoculars. Proceed to the Zayante Trail and repeat the steps above. Record Data.

European Starling

Beginning with 100 individuals introduced into Central Park in New York City in the early 1890s, the European Starling has become one of the most numerous birds on the North American continent. Its successful spread is believed to have come at the expense of many native birds that compete with the starling for nest holes. All the European Starlings in North America descended from 100 birds released in New York's Central Park in the early 1890s. A group dedicated to introducing America to all the birds mentioned in Shakespeare's works set the birds free. Today, European Starlings range from Alaska to Florida and northern Mexico, and their population is estimated at over 200 million birds.

Habitat

Uses a variety of habitats with open country, fields, and trees for nesting; especially near people in agricultural and urban areas.

Nest Type

Nests cavities filled with grass, pine needles, or other objects.

Covered Bridge total- 47 Zayante Trail total- 3

Birds as Indicator Species

By Chad Townsend, Will Lawton, and David Franck

Results

The result of our chi square analysis shows that birds observed and the site at which they are observed are dependent variables. A p value of 1×10^{-50} is convincing evidence against the null hypothesis (birds and sites independent). The data gathered in our survey shows that there are more starlings, ravens, and blackbirds, species commonly found around urbanized areas, at the Covered Bridge Park site than at the Zayante Trail site. At the Zayante Trail site, a more pristine riparian habitat, we found more warblers, woodpeckers, and waterfowl.

Chi Square and Subsequent Analysis

The null hypothesis, or H_0 : There is no association between Birds observed and observation site.

The alternate hypothesis, or H_a : There is an association between Birds observed and observation site.

All cell counts are at least one and no more than 20% are less than 5, qualifying the data set for the Chi Square dependency test.

	Covered Bridge Park	Zayante Trail	Total
Urbanized Native Species	Observed: 227 Expected: 171.9	Observed: 14 Expected: 69.1	241
Waterfowl	Observed: 16 Expected: 52.07	Observed: 57 Expected: 20.93	73
Warblers	Observed: 5 Expected: 19.26	Observed: 22 Expected: 7.74	27
Woodpeckers	Observed: 6 Expected: 22.11	Observed: 25 Expected: 8.89	31
European Starling	Observed: 47 Expected: 35.66	Observed: 3 Expected: 14.34	51
Total	301	121	422

	Covered Bridge Park	Zayante Trail
Urbanized Native Species	17.66	43.94
Waterfowl	24.99	82.16
Warblers	10.56	26.27
Woodpeckers	11.74	29.19
European Starling	3.61	8.97

Because there are $r = 5$ categories of the row variable and $c = 2$ categories of the column variable, the degrees of freedom for this statistic are

$$df = (r-1)(c-1) = (5-1)(2-1) = 4$$

Under the null hypothesis that birds observed and observation sites are not associated variables, the test statistic χ^2 has a χ^2 distribution with $df = 4$. From the calculated value of $\chi^2 = 239.0672$, the p value can be determined: $P = 1.473416E-50$.

There is sufficient evidence ($\chi^2 = 239.0672$, $df = 4$, $P = 1.473416E-50$) of an association between birds observed and observation site in the distribution of bird populations. The size and nature of this association are described by the table of part χ^2 values above.

Covered Bridge Park Site Map



European Starling

Yellow-rumped Warbler

Conclusion

Our results from the chi square analysis, observation data, and site maps lead us to believe that because the Covered Bridge Park is more heavily impacted by anthropogenic influences, species favoring these conditions are more prevalent. The proportionally huge number of urban adapted bird species and low number riparian species sensitive to urbanization suggests that our hypothesis is correct. Our findings also confirm that the Zayante Trail site is pristine in comparison. We spotted few urban adapted birds, and a proportionally greater number of riparian birds. We believe that the discrepancies between the bird populations found at the Covered Bridge Park and Zayante Trail are caused by increased urbanization at the Covered Bridge Park. We cannot prove that urbanization is the direct cause, but it is proven to be detrimental to riparian bird species and is most likely in this case.

Zayante Trail Site Map



Yellow-rumped Warbler

The Yellow-rumped Warbler is one of the most common warblers in North America. Although other warblers have yellow rumps, none are as conspicuous as consistently as this species.

Habitat

Breeds in mature coniferous and mixed coniferous-deciduous woodlands. Winters in open areas along woodland edge, second growth, dunes, marshes, and residential areas.

Food

Insects and some fruit, especially bayberries in winter.

Covered Bridge total- 4 Zayante Trail total- 13

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